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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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MM91/1010

EXAMINER

0490 10, 1

ART UNIT

PAPER NUMBER

2872

DATE MAILED:

10/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/432,112

Applicant(s)

TSUDA ET AL.

Examiner

John Juba

Art Unit

2872

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 11, 15, 16 and 18-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8, 15, 16, 21-24, 29-32, 36-38, 42-47, 49-52 and 55-58 is/are allowed.
- 6) ☒ Claim(s) 20, 25-28, 33-35, 39-41, 48, 53 and 54 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claims 10, 11, 18, and 19 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. These claims do not depend from a *preceding* claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25, 28, 33, 48, 53, and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by Delavaux, et al. Referring to Figure 4 and the associated text, Delavaux, et al disclose a plurality of predetermined segment lengths in combination with optical amplifiers and a dispersion compensator providing a dispersion selected from a plurality of stepwise varying dispersions, which compensator is disclosed as locatable between pre- and post-amplifiers, at the transmitter, or at the receiver (Col. 4, lines 57 – 63). Although the compensators are not *connected at* each of the

transmitter and the receiver, the compensators compensate for dispersion of signal "associated with each of the elements.

With regard to claim 28, Delavaux, et al disclose use of the compensator with fibers carrying wavelength division multiplexed signals (e.g., Fig. 8).

With regard to claim 53, Delavaux, et al disclose the amplifiers as comprising pre- and post-amplifier stages, with the compensator connected therebetween, as best shown in Figure 2 (Col. 3, line 31).

Claims 48 and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa, et al (U.S. Patent number 5,602,666). Referring to Figures 41, 42, and the associated text beginning in Column 41, Ishikawa, et al disclose a dispersion compensator providing a dispersion selected from a plurality of stepwise varying dispersions. Insofar as the channel dispersion is a function of length, the dispersions are inherently determined according to the length of the connecting fibers, and thus to the range of lengths. Ishikawa, et al disclose that a variable dispersion compensator (32) is "associated with" each of the transmitter location, the receiver location, and the intervening repeaters. Although elements (22) are identified as "repeaters", Ishikawa, et al disclose that a pair of optical amplifiers are located at preceding and subsequent stages of the compensators (claim 7 of the reference), as exemplified in Figure 39.

Claims 20 and 39 – 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuda, et al (*Electron. Lett.*). Referring to Figure 1 and the associated text,

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Matsuda, et al disclose a system for adopting dispersion compensation at the receiver, the system comprising a transmission line in the form of a first segment of single mode fiber (SMF) and at least a second segment formed of a dispersion-shifted fiber (DSF), an optical transmitter, an optical receiver, and an optical amplifier at least between two of the segments. The transmitter corresponds to at least one end of the DSF segment, and under these circumstances, the claims do not require a dispersion compensator in the transmitter. The various features of the dependent claims are supported within the text of the disclosure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 26, 27, 34, and ³⁵~~34~~ are rejected under 35 U.S.C. 103 (a) as being unpatentable over Delavaux, et al, in view of Ishikawa, et al (U.S. Patent number 5,602,666). As set forth above for claims 25 and 33, Delavaux, et al disclose the invention substantially as claimed. However, Delavaux, et al do not disclose the fiber type or transmission wavelength.

In the same field of endeavor, Ishikawa, et al disclose a plurality of dispersion compensation schemes useful for long-haul optical communications. Ishikawa, et al

teach that the use of erbium-doped fiber amplifiers operating at 1.55 μm offers has become commonplace because of the resulting capacity for increased transmission distance and speed (Col. 2, lines 51 - 57). Ishikawa, et al further teach that dispersion compensation is appropriate both for networks employing 1.55 μm dispersion shifted fibers and networks employing 1.3 μm zero dispersion single mode fiber (Col. 3, lines 15 - 20).

It would have been obvious to one of ordinary skill to operate the network of Delavaux, et al at a 1.55 μm transmission wavelength, in the interest of permitting the use of erbium doped fiber amplifiers, and thus in the interest of permitting increased transmission distance and speed, as suggested by Ishikawa, et al. As taught by Ishikawa, et al, 1.3 μm zero dispersion single mode fiber is the fiber already in place in may locations. Thus, barring any *unexpectedly* improved result, it appears that the particular selection of 1.3 μm zero dispersion single mode fiber would have been the obvious choice for integration in the network, in the interest of compatibility with existing installations, as taught by Ishikawa, et al.

Allowable Subject Matter

Claims 1 – 8, 15, 16, 21 – 24, 29 - 32, 36 - 38, 42 - 47, 49 – 52, and 55 – 58 are allowable over the prior art of record. Claims 10, 11, 18, and 19 would be allowable if rewritten to overcome the objection under 37 CFR 1.75 (c). The following is a statement of reasons for the indication of allowable subject matter:

The prior art, taken alone or in combination, fails to teach or to fairly suggest the combination of

an optical fiber transmission line composed of a plurality of segments each falling within a predetermined range, an optical amplifier between any two adjacent segments, an optical transmitter, an optical receiver, and a dispersion compensator, the dispersion compensator providing dispersion selected from a plurality of stepwise varying dispersions according to said predetermined range, wherein the compensator is provided between front and rear stage amplifiers of either a transmitter having E/O converters and an optical multiplexer or a receiver having O/E converters and an optical demultiplexer, as recited in claims 1, 15, 16, or 47;

an optical transmission system comprising an optical transmission line including both SMF segments and DSF segments, an optical amplifier connected between any two adjacent segments, an optical transmitter, an optical receiver, and a dispersion compensator, wherein

the amplifier has both a front stage amplifier and a rear stage amplifier, and unless the amplifier is connected to at least one end of a DSF, a dispersion compensator is provided between the front stage and rear stage amplifiers, as recited in claims 5, 21, 29, and 36;

the receiver comprises a pre-amplifier and opto-electrical converter, and unless the receiver is connected to at least one end of a DSF, a dispersion compensator is provided between the pre-amplifier and opto-electric converter of the receiver, as recited in claims 22 and 42;

the transmitter has a plurality of electro-optical converters, a multiplexer, and a front-stage amplifier cascaded with a rear-stage amplifier, and unless the transmitter is connected to at least one end of a DSF, a dispersion compensator is provided between the front-stage and rear-stage amplifiers, as recited in claims 23 and 43;

the receiver has a plurality of opto-electrical converters, a demultiplexer, and a front-stage amplifier cascaded with a rear-stage amplifier, and unless the receiver is connected to at least one end of a DSF, a dispersion compensator is provided between the front-stage and rear-stage amplifiers, as recited in claims 24 and 46;

the transmitter a front-stage amplifier cascaded with a rear-stage amplifier, and unless the transmitter is connected to at least one end of a DSF, a dispersion compensator is provided between the front-stage and rear-stage amplifiers, as recited in claims 49 and 45; or wherein

the receiver has a front-stage amplifier cascaded with a rear-stage amplifier, and unless the receiver is connected to at least one end of a DSF, a dispersion compensator is provided between the front-stage and rear-stage amplifiers, as recited in claims 52 and 58.

With particular regard to claims 1 – 4, 10, 11, 15, 16, and 47, Ishikawa, et al teach compensation at each wavelength path of the transmitter multiplexer or receiver demultiplexer, and do not disclose front-stage and rear-stage amplifiers cascaded in either the receiver or transmitter.

Response to Amendment

Applicants remark that claims 9, 12-14, and 17 are no longer pending. *Relying upon the "Version with markings to show changes made"*, these claims have been canceled.

Applicants' amendment is sufficient in overcoming the rejection of claims 1 – 24 under 35 U.S.C. § 112, second paragraph.

Applicants' amendment is sufficient in overcoming the rejection of claims 1, 4, 9, and 13 under 35 U.S.C. § 102(b) as being anticipated by Delavaux, et al.

Applicants' amendment is sufficient in overcoming the rejection of claims 1, 3, 9, and 11 under § 102(b) as being anticipated by Ishikawa, et al (U.S. 5,602,666).

Applicants' amendment is sufficient in overcoming the rejection of claims 5-8 and 17-19 under § 102 (b) as being anticipated by Matsuda, et al (*Electronics Lett.*).

Applicants' amendment is sufficient in overcoming the rejection of claims 2, 4, 10, 12, and 14 under § 103 (a) as being unpatentable over Ishikawa, et al alone or in view of Miyauchi, et al (U.S. 5,877,881).

Although claim 20 was previously indicated as being allowable if rewritten to overcome the rejection under § 112, second paragraph, Applicants have amended claim 20 such that it no longer requires a dispersion compensator in the optical transmitter. Accordingly, Matsuda, et al (*Electron. Lett.*) has been applied.

Conclusion


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on Mon.- Thu., 9 - 5. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, 7724 for regular communications and (703) 308-7721 (notify examiner) for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


John Juba
October 5, 2001


Cassandra Spyrou
Supervisory Patent Examiner
Technology Center 2800